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ABSTRACT

The question of whether school size directly affects teacher interaction, attitudes, role specialization, and consensus or whether size indirectly affects teacher attitudes and consensus through the mediating effects of interaction was investigated. The effect of size and other contextual variables (for instance, principal support and teacher experience) on teacher behavior was also studied. Path analytic techniques are used to answer the first question and two-stage least squares the second. Data are drawn from teacher surveys in the Alum rock Voucher Demonstration in which 11 schools were subdivided into 51 different-sized minischools. There are indications that teachers are more satisfied with smaller work groups. (Author/IRT)

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THE EFFECTS OF MINI-SCHOOL SIZE ON THE ORGANIZATION AND MANAGEMENT OF INSTRUCTION

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THE EFFECTS OF MINI-SCHOOL SIZE ON THE ORGANIZATION AND MANAGEMENT OF INSTRUCTION

INTRODUCTION

One of the current "reforms" suggested for the improvement of education is the creation of smaller schools austensibly to decrease student alienation and increase the amount of program diversity (Coleman, 1974; Martin, 1974; Brown, 1973). To date little research has actually been undertaken to determine whether smaller sized schools do in fact provide the positive educational benefits ascribed to them.

A study of the Alum Rock Voucher Demonstration provides an opportunity to investigate the effects of different sized schools, since one of its major results was to create new smaller decision-making units called "mini-schools" within the participating elementary schools.

As a result of Alum Rock's participation in the Voucher Demonstration, teachers and principals in participating elementary schools determined how many and what type of programs their school would offer. Parents had 43 mini-schools in six schools the first year of the demonstration and 51 mini-schools in 13 schools during the second and third year of the experiment from which to choose the educational program their children would attend. Simultaneously with the creation of mini-schools, decision-making was decentralized from the district to the mini-school. Mini-school teachers were responsible for making budgetary, curricular, and general policy decisions for their mini-school.

Aside from its other novel features, (e.g. creation of an educational "market"), Alum Rock can be construed as an organizational intervention in which teachers organize themselves into different sized work units or mini-schools to provide various kinds of educational programs. This paper discusses whether and in what ways the size of these mini-schools affect how teachers organize and manage instruction.*

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*Other effects of the voucher demonstration - such as decentralization, the diversity of program offerings, and parent choice - on the organization and management of instruction, are discussed in Roger Rasmussen, et al, Organization, Management, and Incentives in the Alum Rock Schools, WN-9244-NIE, Rand Corporation, Santa Monica, California, February, 1976.

UNDERLYING THEORY AND GUIDANCE HYPOTHESES

The experimental research literature on small groups indicates that members interact and participate more frequently and more equally in groups that are small (Kelly and Thiebaut, 1954; Bales and Borgotta, 1955; Taylor and Faust, 1952). It has been found that smaller groups are subject to more intense peer pressure and therefore exhibit greater intragroup homogeneity of attitudes and behavior (Betz, D., 1972). They are also marked by greater group cohesiveness and more frequent amicability among individual group members (Katz, 1949; Larson, 1949). Members also appear to become less specialized - that is, they tend to function in a wider range of activities - in small group contexts (Barker and Barkers, 1961a, 1961b; Wright, 1961). Also, they conceive of their roles more broadly (Thomas, 1959).

Whereas the results of small group research suggest that a group's size directly affects member satisfaction and attitudes, research on organizational behavior suggests that group size may affect these outcomes only indirectly. According to this perspective, organizational size affects member participation and satisfaction by setting limits on communication, control, role specialization, and coordination processes (Indik, 1965). It is these factors, then, which are presumed to directly structure the quality of interpersonal relationships within the organization.

Support for the indirect effect of group size on member satisfaction is also found in the literature on team teaching. Bredo, in his investigation of collaborative relationships on teaching teams found that although communication and interdependence among teachers were greater in smaller teams, it was these intervening variables rather than group size which directly affected teacher morale (Bruno, 1975).

The research findings from these three bodies of literature are a legitimate source of guiding hypotheses which can be tested with the Alum Rock mini-school data. The specific hypotheses to be examined are:

Hypothesis 1: Degree of role specialization is positively associated with mini-school size.

Hypothesis 2: Degree of interaction among teachers is negatively associated with mini-school size.

Hypothesis 3: Degree of consensus about mini-school policy is negatively associated with mini-school size.

Hypothesis 4: Staff cohesiveness and satisfaction are negatively associated with mini-school size.

If we assume that greater interaction among teachers, greater consensus about program policy and greater cohesiveness and satisfaction are desirable outcomes, and if we find that these outcomes are more often found in smaller-sized decisionmaking units, then we can suggest that unit size itself is a positive and important policy variable, to be considered along with decentralization, program diversity, and parent choice in the design of a multiple options system.

Alternatively, we may find that teachers working in smaller mini-schools may face a unique set of problems. They may experience uncertainty about the continued existence of their mini-school if enrollments vary considerably. Or they may feel overwhelmed by larger programs in the school. Thus there may be some negative aspects to teaching in a smaller mini-school, which school managers may need to be aware of when running programs of different sizes.

In addition to the hypotheses about size which have been suggested by previous research, one other question of potential policy interest will be addressed in this section:

Question 1: Is the degree of parent involvement significantly related to mini-school size?

DATA BASE

Two questionnaires were administered to teachers, one in March, 1975 (Winter 1975 Teacher Survey) and the other in May, 1975 (Spring, 1975 Teacher Survey). All second, fourth and six grade teachers in Alum Rock were given the Winter Teacher Survey. This questionnaire concerned teacher's classroom practices. Teachers were asked to describe such things as grouping practices, use of aides, the amount of time they spent teaching different subjects and the curriculum materials they used. The Spring, 1975 Teacher Survey, administered annually to all Alum Rock Teachers by the Rand Corporation, elicited attitudinal information about working in Alum Rock Schools. The overall response rate for this questionnaire was 89% for voucher teachers and 84% for non-voucher teachers. The third data source this study draws upon was a series of interviews conducted with 24 mini-school coordinators in a representative sample of Voucher Demonstration schools.

For operational purposes, we define "small" mini-schools as those with one to four teachers; "medium" mini-schools, between five and seven teachers; and "large" mini-schools, greater than seven teachers. These categories provide a reasonably balanced trichotomization of the 51 mini-schools in Alum Rock as shown in Table 1.

TABLE 1

NUMBER OF MINI-SCHOOLS IN EACH CATEGORY OF MINI-SCHOOL SIZE*

Small	Medium	Large	Total
17	20	14	51

*Data on number of mini-schools is for year 3 (1974-75) of the Voucher Demonstration.

MINI-SCHOOL SIZE AND ROLE SPECIALIZATION

To measure the degree of role specialization, our sample of mini-school coordinators was asked to report who in the mini-school was responsible for each of five major activities: budget, curriculum, discipline, dealing with parents, and realtions with other mini-schools. A crude scale was constructed by assigning a score of 1 to a response indicating that "we all share"; 2 if "each teacher does his/her own"; 3 if "a specific teacher is responsible".

The data in Tables 2a and 2b show that the relationship between mini-school size and role specialization is extremely task dependent. For example, most mini-schools, regardless of size, delegate responsibility for budget and coordination with other mini-schools: in 18 of the 22 sample mini-schools one person is in charge of the budget; in two-thirds, one person handled relations with other mini-schools (see Table 2a).

Table 2a

RELATIONSHIP BETWEEN MINI-SCHOOL SIZE AND ROLE SPECIALIZATION IN BUDGET AND COORDINATION WITH OTHER MINI-SCHOOLS

Task	Role Specialization	School Size			
		Small	Medium	Large	All Sizes
Budget	Share	17%	22%	14%	18% (4)
	Each does own	0	0	0	0 (0)
	Specific teacher	83%	77%	86%	82% (18)
	Total*	100% (6)	100% (9)	100%(7)	100% (22)
Relations with other mini-schools	Share	33%	25%	25%	28% (5)
	Each does own	0	0	25%	6% (1)
	Specific teacher	66%	75%	50%	67% (12)
	Total*	100% (6)	100% (8)	100%(4)	100% (18)

*The total summed percentage may not equal 100% due to rounding.

The technicalities of the Income-Outgo budget and the time required to master and maintain knowledge of it makes role specialization in budgetary matters more efficient than sharing. In fact, mini-school coordinators even report that these functions were assumed by the principal or vice-principal in some schools. Yet, coordinators report that for large expenditure decisions, group consensus is more typical. Role specialization in fiscal matters, then may be confined more to monitoring than to actual decisionmaking.

The remaining three activities--curriculum, discipline, and relations with parents--have traditionally been matters within the domain of the individual teacher. We would expect teachers either to maintain this traditional role or to break out of it and move toward an overall sharing of each others' responsibilities. Therefore, role specialization is not expected in these three areas. Reference to Table 2b corroborates these expectations. Teachers either "do their own thing" (most often in the large mini-schools) or share (most often in the small mini-schools). Role specialization is reported infrequently.

Table 2b

RELATIONSHIP BETWEEN MINI-SCHOOL SIZE AND ROLE SPECIALIZATION IN CURRICULUM, DISCIPLINE AND RELATIONS WITH PARENTS

Task	Role Specialization	School Size			
		Small	Medium	Large	All Sizes
Curriculum	Share	83%	66%	42%	64% (14)
	Each does own	—	33%	42%	28% (6)
	Specific teacher	17%	—	14%	9% (2)
	Total*	100% (6)	100% (9)	100% (7)	100% (22)
Discipline	Share	83%	22%	29%	41% (9)
	Each does own	17%	78%	71%	60% (13)
	Specific teacher	—	—	—	0.0% (10)
	Total*	100% (6)	100% (9)	100% (7)	100% (22)
Dealing with Parents	Share	83%	44%	—	43% (9)
	Each does own	17%	44%	66%	43% (9)
	Specific teacher	—	12%	33%	14% (3)
	Total*	100% (6)	100% (9)	100% (6)	100% (21)

*The total summed percentage may not equal 100% due to rounding.

MINI-SCHOOL SIZE AND TEACHER INTERACTION

It is hypothesized that teachers in smaller mini-schools more frequently discuss teaching among themselves, plan lessons together, and meet with each other more frequently than teachers in larger mini-schools.

Teachers' responses to three questions on the Winter 1975 and Spring 1975 teacher surveys were used to measure teacher interaction:

1. "Do you usually plan lessons or activities by yourself, or do you plan them jointly with other teachers?"*

*From Winter 1975 Teacher Survey - (Response options were: Usually by myself = 1; usually with others = 2.) a mini-school's median response was taken as a measure of teacher planning, referred to hereafter as "Plan together."

2. "How frequently do you discuss educational matters (techniques, etc.) with teachers in your mini-school?"*
3. "How often do teachers in your mini-school hold staff meetings?"**

The data in Table 3 indicate that each of these teacher interaction measures is significantly correlated with the other and that each is significantly related to mini-school size. Teachers in smaller mini-schools are more likely to plan lessons or activities together, are likely to hold staff meetings more frequently and are likely to discuss teaching more frequently than their counterparts in larger mini-schools. A total interaction scale, constructed to summarize these three variables ($\alpha = .70$), also is significantly related to mini-school size.

The raltionships between mini-school size and the teacher interaction variables are displayed more fully in Tables 4, 5, and 6.

Teachers in small mini-schools meet frequently during the week, whereas teachers in medium and large mini-schools hold meetings only occasionally during the month. Planning together occurs much more often in small and medium sized mini-schools than in the larger ones. Finally, on the average teachers discuss educational issues with each other daily in small mini-schools, occasionally during the week in medium sized mini-schools and once a week or less in large mini-schools.

Although the correlations between mini-school size and the teacher interaction variables are statistically significant, size only accounts for a small percentage of the variance in each of these variables (discussing--15%; planning--12%; meeting--14%).

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*From Winter 1975 Teacher Survey - (Response options were: several times a day = 1; daily = 2; several times a week = 3; about once a week = 4; once or twice a month = 5; less than once a month = 6; seldom or never = 7.) A mini-school's median response defines the teacher interaction measure called "Discussing."

**From Spring 1975 Teacher Survey - (Response options were: daily = 1; several times a week = 2; about one a week = 3; once or twice a month = 4; less than once a month = 5; seldom or never = 6.) A mini-school's median response defines the teacher interaction variable we call "Meeting."

Table 3

CORRELATION MATRIX OF MINI-SCHOOL SIZE AND TEACHER INTERACTION VARIABLES

Interaction Variables	1	2	3	4	Size
1. Plan together	1.00	--	--	--	-.34[a]
2. Meeting	.48[b]	1.00	--	--	-.37[a]
3. Discussing	.48[b]	.47[b]	1.00	--	-.39[a]
4. Total interaction scale	.67[c]	.80[c]	.73[c]	1.00	-.35[a]

[a] p .05

[b] p .01

[c] p .001

Table 4

RELATIONSHIP BETWEEN MINI-SCHOOL SIZE AND FREQUENCY OF MINI-SCHOOL STAFF MEETING[a]

Frequency of Staff Meetings	Mini-School Size			
	Small	Medium	Large	All Sizes
More than once a week	60%	20%	8%	29% (14)
Once a week	40%	60%	62%	54% (26)
Less than once a week	--	20%	31%	17% (8)
Total	100% (15)	100% (20)	100% (13)	100% (48)

[a] $r = -.37$ $p < .05$, χ-square = 13.00* $p < .04$.

*The total summed percentage may not equal 100% due to rounding.

Table 5

RELATIONSHIP BETWEEN MINI-SCHOOL SIZE AND WHETHER TEACHERS WORK WITH OTHERS TO PLAN LESSONS AND ACTIVITIES[a]

Planning	Mini-School Size			
	Small	Medium	Large	All Sizes
Plan by self	29%	37%	67%	45% (17)
Plan with Others	71%	63%	33%	55% (21)
Total*	100% (7)	100% (19)	100% (12)	100% (38)

[a] $r = -.34$ $p < .05$.

*The total summed percentage may not equal 100% due to rounding.

Table 6

RELATIONSHIP BETWEEN MINI-SCHOOL SIZE AND FREQUENCY TEACHERS DISCUSS EDUCATIONAL ISSUES[a]

How Often Teachers Discuss Educational Issues	Mini-School Size			
	Small	Medium	Large	All Sizes
More than daily	57% (4)	21% (4)	25% (3)	29% (11)
Several times a week	29% (2)	47% (10)	33% (4)	33% (16)
Once a week or less	14% (1)	32% (5)	42% (5)	29% (11)
Total*	100% (7)	100% (19)	100% (12)	100% (38)

[a] $r = .35$ $p < .05$.

*The total summed percentage may not equal 100% due to rounding.

MINI-SCHOOL SIZE AND PROGRAM COORDINATION

It is hypothesized that teachers working in smaller mini-schools more frequently adhere to a common policy about standards of student behavior, teaching methods, grouping of students, and the way students are treated. We have operationalized program coordination using responses to the following question from the Winter 1975 Teacher Survey:

> "Do teachers in your mini-school follow a common policy regarding: what students are expected to learn, what teaching methods should be used, how students are to be grouped; and standards of students' behavior?"*

Zero order correlations (Table 7) indicate that all the common policy questions are negatively correlated with size, but the only significant correlation is between size and teacher expectations about what students are expected to learn ($r = -42$, $p < .001$). Because the four measures of program coordination are significantly interrelated, they were combined together to form a common policy scale ($\alpha = .80$) which is significantly and negatively correlated with program size.

Multiple regression analyses were performed to determine how size and program coordination are associated. Small school size may be only a necessary not a sufficient causal factor of program coordination. Perhaps a high level of interaction among teachers is necessary for staffs to agree on certain policies. If this were the case we would expect the interaction variables (planning together; discussing teaching and holding staff meetings frequently) to play an intervening role between school size and program coordination. An exogenous variable other than school size likely to affect the existence of common policies is whether a school is an elementary or middle school (variable = Elementary: 1 = elementary; 2 = middle). Middle school teachers, given the absence of self-contained classes and the existence of subject matter departmentalization might be expected to report less program coordination.

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*Response options: there is no common policy = 1; most follow a common policy = 2; all follow a common policy = 3.

Table 7

RELATIONSHIP BETWEEN MINI-SCHOOL SIZE, FOUR MEASURES OF PROGRAM COORDINATION, AND THE COMMON POLICY SCALE

Measures of Common Policy	1	2	3	4	Size
Common policy: learning (1)	1.00	--	--	--	-.42[c]
Common policy: teaching methods (2)	.76[c]	1.00	--	--	-.18
Common policy: grouping (3)	.49[c]	.44[b]	1.00	--	-.17
Common policy: student behavior (4)	.53[c]	.30[c]	.37[b]	1.00	-.24
Common policy scale (5)	.87[c]	.83[c]	.76[c]	.71[c]	-.33[a]

[a] $p < .05$; [b] $p < .01$; [c] $p < .001$

Table 8 lists the simple correlations of these variables with the common policy scale. All the interaction variables and the two exogenous variables are significantly related to program coordination.

The first regression analysis indicates that the direct effect of mini-school size on consensus about mini-school policies is negligible (see Figure 1). There is, however, an indirect effect of mini-school size mediated through the interaction variables, which is equal to -.19. Therefore, the value of the simple correlation between mini-school size and the common policy scale ($r = -.33$) is due in part to the indirect effect of increased interaction which occurs in smaller mini-schools rather than to the effect of mini-school size, per se. The analysis also shows that elementary mini-schools are in fact more likely to have teacher consensus about educational policies. This simple model accounts for 44 percent of the variance in the common policy scale.

We conducted a second and similar analysis to determine which of the interaction variables were most related to the establishment of teacher consensus about mini-school policies. The results of this analysis are schematically shown in Fig. 2. By incorporating the individual interaction

Table 8

CORRELATIONS OF VARIABLES RELATED TO THE COMMON POLICY SCALE

Mini-school size	-.33[a]
School type	-.35[a]
Planning	.66[c]
Discussing	.80[b]
Meeting	.57[c]
Total interaction scale	.62[c]

[a] $p < .05$

[b] $p < .01$

[c] $p < .001$

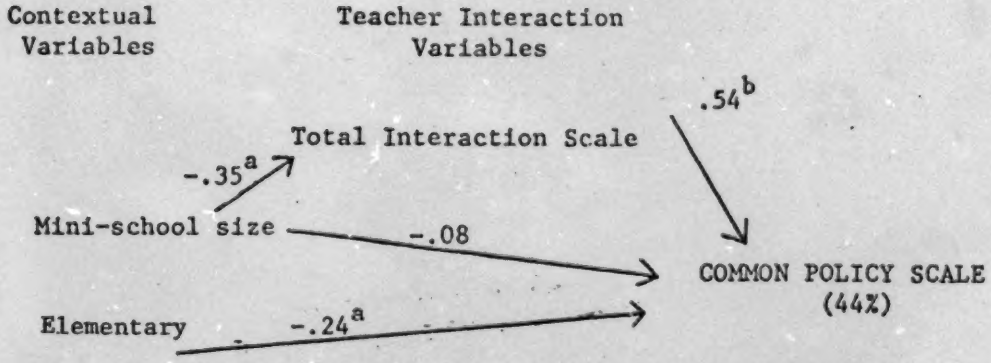

Fig. 1--Schematic of Variables Affecting the Existence of Common Policies (a = $p < .05$; b = $p < .01$)

variables--planning and meeting--along with the contextual variables of mini-school size and school type, we account for 60 percent of the variance in the common policy scale.

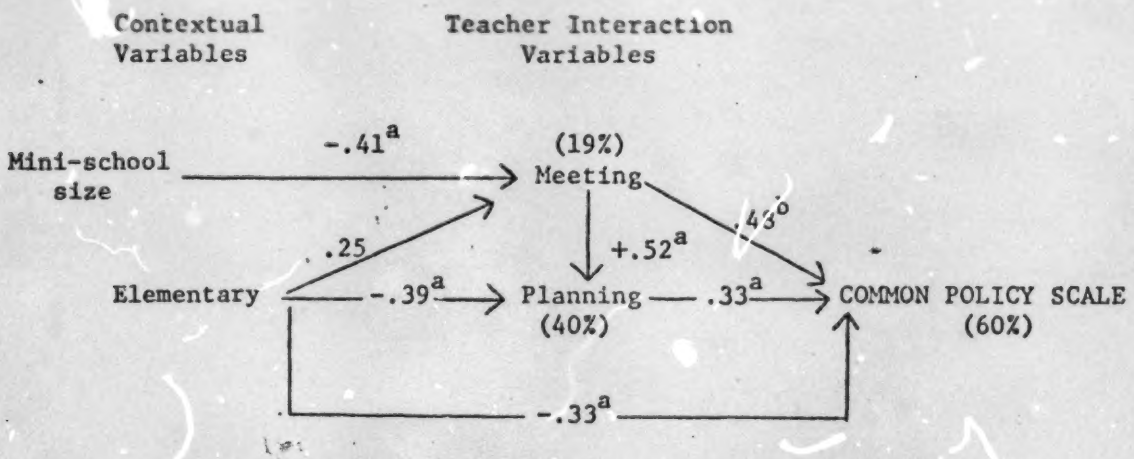

Fig. 2--Schematic of Variables Affecting the Existence of Common Policies (a = p < .01; b = p < .001)

Figure 2 indicates several things. As in our previous analysis, the high simple correlation between mini-school size and the common policy scale ($r = -.33$) is not due to the direct effect of mini-school size ($\beta = .02$). Rather it is due in part to the fact that smaller mini-schools tend to hold meetings more frequently, resulting in the adherence of a common set of policies. The fact that more meetings lead to more joint planning, which in turn results in common policies, also contributes to the size-common policy relationship.

Opposed to the effect of school size is that of school type, which has both a direct *and* indirect effect on the common policy scale. First, teachers in elementary schools are more likely to agree about mini-school policies as the high value of the standardized β coefficient indicates ($\beta = -.33$). Middle school teachers, because they meet more frequently than their counterparts in elementary schools, should tend to agree on mini-school policies. But because middle schools do less joint planning in their meetings ($r = -.39$), the agenda of junior high mini-school staff meetings may have little to do with the topics measured by our common policy scale. In short, two conflicting processes--more frequent meetings and less attention to planning and their respective links to common policies--balance each other out in middle schools. As a result, the path coefficient between school type and the common policy scale approximates their simple correlation, reflecting the pure association between elementary school mini-school staffs agreeing on and

their adherence to common policies about educational matters.

Overall, our findings suggest that size is an important structural source of differences in what transpires within the mini-schools. But because these findings must be bracketed in methodological caveats, they are *only* suggestive. They assume the weak causal ordering of the variables as diagrammed and ignore possible feedback effects.

MINI-SCHOOL SIZE AND TEACHER ATTITUDES

In this section we investigate how mini-school size affects teacher attitudes. In this section, we analyze two additional sources of data. the first comprises reports of coordinators in our mini-school sample. These reports give an indication of how school size is related to problems the coordinator's encountered, teacher loyalty, and preferred mini-school size. The second source consists of data from a Work Environment Scale in the Spring 1975 Teacher Survey. We use these data to show the effect mini-school size has on teachers' perceived cohesion, perceived innovation, and satisfaction with the Voucher Demonstration.

Analysis of Data From Coordinator Reports

Mini-school coordinators reported four types of problems they faced during the past school year: personality, budget, enrollment, and organization. The distribution of responses by school size are shown in Table 9. Owing to small cell sizes, we cannot differentiate among size categories by problem type, but it is evident that the small mini-school's have the lowest frequency of problems reported. For all school sizes, the most frequently cited problem has to do with interpersonal relationships within mini-schools.

We also asked mini-school coordinators whether the primary allegiance of the teachers in their mini-school lay with the school or just the mini-school. Data shown in Table 10 show that loyalty to the mini-school itself occurs most frequently among teachers in the small mini-schools.

Finally, the coordinators were asked what they considered the ideal size of a mini-school. The distribution of responses, shown in Table 11, reveals a tendency for teachers in small or medium size mini-schools to

Table 9

THE RELATIONSHIP BETWEEN SCHOOL SIZE AND TYPE OF PROBLEMS REPORTED BY MINI-SCHOOL COORDINATORS IN SCHOOLS OF EACH SIZE

Report of Problem	School Size			
	Small	Medium	Large	All Sizes
No problem	43%	--	20%	19.0% (4)
Personality	29%	13%	60%	29.0% (6)
Budget	--	38%	20%	19.0% (4)
Enrollment	29%	13%	--	14.0% (3)
Org. prob.	--	38%	--	14.0% (3)
Total	100% (7)	100% (8)	100% (5)	100% (20)

Table 10

RELATIONSHIP BETWEEN MINI-SCHOOL SIZE AND LOYALTY TO THE MINI-SCHOOL AS REPORTED BY MINI-SCHOOL COORDINATORS[a]

Loyalty	School Site			
	Small	Medium	Large	All Sizes
To Mini-school	85.7% (6)	50% (4)	12.5% (1)	47.8% (11)
To School	14.3% (1)	50% (5)	87.5% (4)	52.2% (12)

[a] $r = .68$ $p < .001$, χ-square = 8.04 $p < .02$ with

regard the size of their present school as ideal. The teachers in large size mini-schools, however, clearly exhibit the opposite tendency, favoring schools with a staff of from five to seven teachers. It appears that there is a disjuncture between actual and ideal mini-school size only for teachers in the large mini-schools.

Once again, the evidence suggests that problems encountered, teacher loyalty, and preferred size of work group are all negatively related, to mini-school size. The data also indicates that regardless of school size teachers frequently report problems in getting along with their peers.

TABLE 11

RELATIONSHIP BETWEEN MINI-SCHOOL SIZE AND MINI-SCHOOL COORDINATORS REPORT OF IDEAL MINI-SCHOOL SIZE[a]

Ideal School Size	School Size: Small 2-4	Medium 5-7	Large 7+	Total
Small (3-4)	62.4%	14.3%	--	28.6% (6)
Medium (5-7)	25.0%	85.7%	83.3%	61.9% (13)
Large (7+)	12.5%	--	16.7%	9.5% (2)

a_r = .46 p < .04 x-square = 9.3 p < .05 with 4 df.

Analysis of Data from the Spring 1975 Teacher Survey

The final set of attitudinal data measure teachers' perceptions of cohesion and innovation within their mini-school and the determinants of satisfaction with the voucher demonstration.

Cohesion. As the correlations in Table 12 indicate, high cohesion* among mini-school teachers is related to high teacher interaction, frequent discussions about educational matters, agreements about mini-school policy, whether teachers teach in an elementary school, and how long a school has been in the demonstration.

Multiple regression was used to identify which variables most significantly *and* directly affect cohesion. A plausible model suggested by the data, accounting for 50 percent of the variance in cohesion, is shown in Fig. 3.**

*Perceived cohesion within mini-schools was measured by asking teachers to respond true or false to each of the following questions about their mini-school.

- People go out of their way to help a new staff member feel comfortable.
- The atmosphere is somewhat impersonal.
- Staff members do things together after work.
- People take a personal interest in each other.

Responses to these questions were combined to form a cohesion scale (α = .83) measuring in effect how well teachers within a mini-school get along.

**Paths not shown were found to be insignificant but are included in

TABLE 12

CORRELATION OF COHESION WITH CONTEXTUAL, INTERACTION, AND COMMON POLICY VARIABLES

Contextual	
Mini-school size	-.17
Elementary	-.35[a]
Participation	.43[b]
Interaction	
Discussing	.50[a]
Meeting	.49[c]
Total Interaction Scale	.58[c]
Common Policy Scale	.48[c]

[a] $p < .05$
[b] $p < .01$
[c] $p < .001$

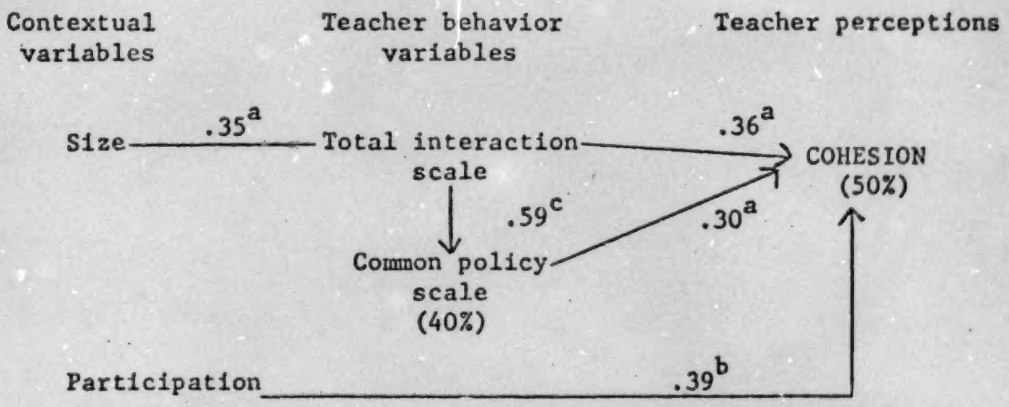

Fig. 3--Schematic of Variables Affecting Cohesion
(a = $p < .05$; b = $p < .01$; c = $p < .001$)

According to this model, teachers' perceptions of cohesion are directly related to their interaction and to the establishment of common policies, as well as indirectly to common policies established through high interaction.

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the total model. Size, total interaction, common policy scale, school type and participation were used to predict cohesion. Size, total interaction, school type and participation were used to predict the common policy scale.

Size has no direct effect on cohesion, but still serves to provide an environment in which high teacher interaction can occur. The one contextual variable directly affecting teacher cohesion is the length of time a school has participated in the voucher demonstration. This suggests either that cohesiveness among teachers takes time to develop or that the initial voucher schools contained faculties which were more cohesive than the later joining schools.

Innovation. The correlations in Table 13 indicate that innovation* is significantly associated with two of our three contextual variables (participation and school type), all the interaction variables (except planning), the common policy scale, and cohesion. The same table indicates, however, that these relationships are all substantially reduced by controlling for the effect of cohesion.

Table 13

CORRELATION OF INNOVATION SCALE WITH ASSOCIATED VARIABLES AND PARTIAL CORRELATIONS, CONTROLLING FOR COHESION

	Simple Correlation	Partial Correlation, Controlling for Cohesion
Contextual Variable		
Mini-school size	-.17	-.14
Participation	.43[a]	.06
Elementary	-.35[b]	-.28
Interaction Variables		
Discussing	.50[a]	.17
Planning	.27	.28
Meeting	.49[b]	.03
Total interaction scale	.58[b]	.25
Common policy scale	.48[b]	.16
Cohesion	.56[b]	

[a] $p < .01$

[b] $p < .001$

*Perceptions of innovation were measured by asking teachers to respond true or false to each of the following questions about their mini-schools.

o Doing things in a different way is valued.

This means that cohesion incorporates much of the variance of both the contextual variables (especially length of participation in the demonstration) and the teacher behavior variables (interaction and common policy). This is not particularly surprising since most of these variables were used to predict cohesion and did so to a significant extent (see Fig. 3). Although cohesion accounts for only 30 percent of the variance in innovation, adding any of the variables above increases the amount of explained variance by only 10 percent.

In sum, mini-school size appears to influence innovation only indirectly through its effect on teacher interaction. The establishment of common policies and teacher interaction both contribute positively to the degree of cohesion teachers perceive in their mini-schools. If such cohesion exists, then teachers are likely to be willing to experiment with novel educational techniques.

Satisfaction with Vouchers. When teachers were asked how pleased or displeased they were about participating in the voucher demonstration, two-thirds reported they were either very pleased or pleased.* Two sets of variables and one contextual variable (participation) are all significantly related to teacher satisfaction with the Voucher Demonstration (see Table 14).

The first set of variables has to do with enrollment. All Alum Rock teachers were asked the following three questions:

- Do you feel that instability of class enrollments has been a problem in the demonstration this year? (Variable = median percent responding "Yes, a major problem" for each mini-school.)
- Some people have suggested that under the voucher demonstration teachers are competing to get students into their programs. Is there such competition at your school? (Variable = median percent responding "yes, a great deal" for each mini-school.)

- New and different ideas are always being tried out.
- This mini-school would be one of the first to try out new ideas.
- Variety and change are not particularly important.

Responses to these questions were combined to form an innovation scale (α = .61) measuring the extent innovation is valued and exercised.

*Spring 1975 Teacher Survey - there were 5 possible responses: very pleased (1), pleased (2), somewhat displeased (3), very displeased (4), indifferent (5).

- Has your mini-school ever had any worries about maintaining the desired level of student enrollment? (Variable = median percent responding "yes" in each mini-school.)

Table 14

CORRELATIONS OF TEACHER SATISFACTION WITH CONTEXTUAL, ENROLLMENT AND WORK ENVIRONMENT VARIABLES

Contextual	
Mini-school size	.03
Participation	.56[c]
Enrollment	
Major problem	-.41[b]
Teachers worry about	-.37[b]
No competition for	.48[c]
Work Environment	
Cohesion	.29[a]
Innovation	.34[a]
Common policy: student behavior	.37[b]
Tension among Mini-schools	-.55[c]

[a] $p < .05$

[b] $p < .01$

[c] $p < .001$

The second set of variables has to do with teachers' work environment: perceptions of innovation and cohesion, whether tension among mini-schools is a major problem, and whether teachers agree on a policy toward student behavior.

A multiple regression predicting satisfaction with vouchers was run using a subset of these variables. Cohesion was omitted because of its high association with innovation ($r = .56^*$); tension among mini-schools because the enrollment variables wash out its effect almost totally (to a partial $r = -11$), and common policy on student behavior, because the inclusion of innovation decreases its correlation with satisfaction to a correlation of .14. The standardized β coefficients of the included variables are shown in Table 15.

$^*p < .001$.

Table 15

MULTIPLE REGRESSION RESULTS FOR VARIABLES PREDICTING SATISFACTION WITH VOUCHERS

Variables	Final Standardized Coefficient	Variance Accounted for in Each Step
Participation	.40[a]	32%
Enrollment a major problem	-.30[b]	44%
Teachers worry about enrollment	-.27[b]	54%
Innovation	.20	57%
No competition for enrollment	.20	61%
Mini-school size	.00	61%

[a] $p < .001$

[b] $p < .01$

The regression results indicate that the strongest predictor of satisfaction is the length of time mini-schools have been in the demonstration. Part of this result may be due to differences between initial and later joining voucher schools. Alternatively the longer a school has been in the demonstration, the more time mini-school members have had to adjust and iron out start-up problems. Partial correlations of the variables with satisfaction, controlling for length of participation (see Table 16) support both interpretations.

Controlling for length of participation decreases the correlation between innovation and satisfaction, which is consistent with the first interpretation. This suggests that the schools volunteering to participate initially in the demonstration had teachers who were more willing to experiment with new educational ideas than did schools joining later. The effect of participation also decreases the power of competition, which is consistent with the second interpretation. Mini-schools participating in the demonstration for three years are less subject to report competition for enrollment. They either perceive it as a nonproblem or less of one. However, regardless of

length of participation, the instability of enrollments due to the voucher demonstration remains problematic to teachers.

TABLE 16

PARTIAL CORRELATION OF VARIABLES ASSOCIATED WITH SATISFACTION WITH VOUCHERS, CONTROLLING FOR PARTICIPATION

Variable	Zero Order Correlation	Partial Correlation Controlling for Participation
Class enrollment a major problem	-.41[b]	-.43
Teachers worry about enrollment	-.37[b]	-.42
No competition for enrollment	.48[c]	.36
Innovation	.34[a]	.22

[a] $p < .05$
[b] $p < .01$
[c] $p < .001$

MINI-SCHOOL SIZE AND PARENT INFLUENCE

To determine whether the staffs in smaller mini-schools were more amenable to having parents influence mini-school policy, we asked teachers the following question in the Spring 1975 Teacher Survey:

- Does your mini-school's parent advisory council have a lot of influence, some influence, or no influence over the following decision areas in your mini-school? Curriculum; budget; new teacher hiring; student discipline?

In mini-schools in which parents had influence on any of the four decision areas, they also had influence on the others as the correlations in Table 17 indicate. Therefore, the items were combined to form a parent influence scale ($\alpha = .82$).

Only one variable--length of participation in vouchers ($r = .39$ $p < .05$)--

Table 17

CORRELATION MATRIX OF PARENT INFLUENCE VARIABLES

Parent influence on		1	2	3	4
curriculum	(1)	1.00	—	—	—
budget	(2)	.69[b]	1.00	—	—
new teacher hiring	(3)	.63[b]	.53[b]	1.00	—
student discipline	(4)	.63[b]	.32[a]	.53[b]	100
parent influence scale	(5)	.89[b]	.84[b]	.86[b]	.57[b]

[a] $p < .05$

[b] $p < .001$

was significantly associated with parent influence. This result has two implications: (1) the influence of parent advisory boards increases the longer a mini-school is in the demonstration, but (2) these boards seem to have little effect on the organization and management of instruction as measured by our variables.

Mini-school coordinator's reports of how advisory boards operate corroborate these points. According to the coordinator's reports, mini-school faculty present major issues to their advisory boards, e.g., acquisition of new materials and curricula; field trips, etc. Parents seldom disapprove of such initiatives, usually deferring to the teachers' educational leadership. In some instances parents did bring issues to the teachers--for example, requesting progress reports on their children, or voicing concern about coverage of certain topics (e.g., a Spanish unit in a traditional mini-school or evolution in a science class). Such instances either are infrequent or our measures are insensitive to them.

CONCLUSIONS

This paper began with the question: "How and why is the organization and management of instruction in Alum Rock affected by the *size* of mini-schools?" The answer, as suggested by various types of data, is that size has both direct and indirect effects, and these effects are confounded by school type and the effects of the experiment itself.

Table 18 shows the variables under investigation and summarizes what kind of effect the contextual variables have on them. These results can be interpreted as if they were the results of two different experiments. One experiment entails merely changing the size of the school unit. In this case we would be investigating how mini units of various sizes affect teacher interaction, policy coordination, cohesion, and satisfaction. In a second experiment we would be investigating how these variables are affected by participation in a voucher demonstration. In this case the mini units of choice would all be of *similar* size.

In the imaginary experiment in which the school unit was arbitrarily broken up into mini-schools of different sizes, we would find a significant difference in the organization of small and large mini-schools. Teachers in small mini-schools interact with each other much more frequently--they plan lessons and activities, discuss educational matters, and hold staff meetings more often. Also, they are more likely to work together on tasks relating to curriculum, discipline and relations with parents, unlike teachers in larger mini-schools who tend to act as independent agents in these areas. The greater degree of interaction among teachers in small mini-schools also seems to bring about a consensus on mini-school policies. We also find this consensus existing among elementary school teachers to a much greater extent than among middle school teachers.

One last set of variables distinguishes the various sized school units. Teachers in small mini-schools have fewer interpersonal and organizational problems whereas their counterparts in large mini-schools

Table 18

SUMMARY OF RESULTS
The Effects of Voucher Participation and Mini-School Size on the Organization and Management of Instruction*

Variables under Investigation	Contextual Variables			Intervening Variables
	Voucher Related	Organizational		
	Length of Participation on demonstration	Mini-school Size	School Type	
Role specialization Budget, coordination	D	--	--	--
Role specialization Curriculum, discipline	--	D	--	--
Relations with parents	--	D	--	--
Interaction	--	I	D	Interaction meeting, planning)
Common policy	--	D	--	--
Attitudes Problems, ideal size, loyalty	--	D	--	Common policy, interaction
Cohesion	D	I	--	Cohesion
Innovation	--	--	--	Innovation
Satisfaction	D			--
Parent influence	D	--	--	--

*D = Direct effect; I = Indirect effect.

seem to have more difficulty in getting along and managing their mini-school. Teachers in small mini-schools are also more loyal to their mini-schools, while teachers in large mini-schools are more loyal to their school. One of the most intriguing results of the imaginary experiment is that teachers in large mini-schools overwhelmingly prefer to work in medium size units, unlike the teachers in small or medium size mini-schools, who are satisfied with the current size of their respective mini-schools.

On the other hand, the results would be different if our imaginary experiment entailed organizing the school into *smaller* but *similar sized* units offering different programs, having discretionary funds, and competing for students. The schools, initially volunteering to participate in the experiment, might be *self-selected,* and therefore be composed of more adventurous and/or innovative teachers.

As in any new experiment, there would be many start-up problems. Teachers have to learn how to handle new responsibilities. Each mini-school needs someone to take responsibility for budgetary matters and someone to act as a "go-between' with other mini-schools in the school. Teachers also lose their anonymity when they find themselves in a working relationship with other teachers rather than on their own, as is traditionally the case. Eventually they adjust to their new status and achieve a sense of cohesion.

As they continue to participate teachers grow more satisfied with the experiment. They also seem more willing to allow parents' influence over their mini-school affairs. Although fear of competition for students among mini-schools dissipates, instability of class enrollments remains problematic.

The results from this "experiment" must be regarded as tentative since the data which describe them are cross-sectional. A longitudinal investigation would strengthen the certainty of the seeming differences we have detected between our early and late joiners to the experiment; also it would show whether these differences cause our results or whether the results are merely artifacts of the experiment per se.

The policy implications of our two experiments must be viewed as tentative. We have looked at how participation in the voucher demonstration and alteration of school unit size affect teachers. We have found indications that teachers are more satisfied with smaller work groups. Yet we have not included any discussion about the effects of such an organizational intervention on principals and problems they might have with school management. Similarly we have still to investigate what effect mini-school size has on student cognitive and affective outcomes. Ultimately, the results reported will have to be weighed against these other effects within the total system

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